

What is claimed is:

1. A cleaning solution comprising from about 10% to about 35% by weight of hydrogen fluoride (HF), from about 10% to about 35% by weight of ammonium fluoride (NH₄F) and from about 30% to about 80% by weight of de-ionized water (H₂O) based on a total amount of the cleaning solution.

2. A method of cleaning a semiconductor substrate, comprising:

providing a substrate having a top surface, a bottom surface and a bevel portion constituting a side edge extending between said top and bottom surfaces, and a layer comprising a nitride that extends over said top surface and onto said bevel portion;

preparing a cleaning solution comprising from about 10% to about 35% by weight of hydrogen fluoride (HF), from about 10% to about 35% by weight of ammonium fluoride (NH₄F) and from about 30% to about 80% by weight of de-ionized water (H₂O) based on a total amount of the cleaning solution;

selectively exposing the bevel portion of the substrate to the cleaning solution to thereby remove the layer from the bevel portion while leaving the layer on the top surface;

subsequently rinsing the substrate of cleaning solution remaining on the semiconductor substrate; and

subsequently drying the substrate.

3. The method of cleaning a semiconductor substrate of claim 2, further comprising maintaining the temperature cleaning solution in a range of from about 15°C to about 35°C while the cleaning solution is removing the layer from the bevel portion.

4. The method of cleaning a semiconductor substrate of claim 2, wherein said exposing comprises spraying the cleaning solution toward the bevel portion of the substrate through a nozzle.

5. The method of cleaning a semiconductor substrate of claim 2, wherein the layer includes a nitride layer.

6. The method of cleaning a semiconductor substrate of claim 2, wherein the layer comprises an oxide layer, and a nitride layer disposed on the oxide layer.

7. The method of cleaning a semiconductor substrate of claim 2, wherein the layer comprises a nitride layer, and an oxide layer disposed on the oxide layer.

8. A method of cleaning a semiconductor substrate comprising:
providing a substrate having a top surface, a bottom surface and a bevel portion constituting a side edge extending between said top and bottom surfaces,

and a layer comprising a nitride that extends over said top surface and onto said bottom portion;

preparing a cleaning solution comprising from about 10% to about 35% by weight of hydrogen fluoride (HF), from about 10% to about 35% by weight of ammonium fluoride (NH₄F) and from about 30% to about 80% by weight of de-ionized water (H₂O) based on a total amount of the cleaning solution;

removing the layer from the bottom portion of the substrate by dipping the substrate into the cleaning solution;

subsequently rinsing the substrate of cleaning solution remaining on the semiconductor substrate; and

subsequently drying the substrate.

9. The method of cleaning a semiconductor substrate of claim 8, further comprising maintaining the temperature cleaning solution in a range of from about 15°C to about 35°C while the cleaning solution is removing the layer from the bottom portion.

10. The method of cleaning a semiconductor substrate of claim 8, wherein one of a nitride layer, a composite layer of an oxide layer/nitride layer and a composite layer of a nitride layer/oxide layer is formed on the semiconductor substrate, and a photoresist film is formed on the substrate.

11. The method of cleaning a semiconductor substrate of claim 8,

wherein the layer includes of a nitride layer.

12. The method of cleaning a semiconductor substrate of claim 8, wherein the layer comprises an oxide layer, and a nitride layer disposed on the oxide layer.

13. The method of cleaning a semiconductor substrate of claim 8, wherein the layer comprises a nitride layer, and an oxide layer disposed on the oxide layer.

14. A method of cleaning a substrate comprising:
providing a substrate having a top surface, and a nitride layer that extends over said top surface;
preparing a cleaning solution comprising from about 10% to about 35% by weight of hydrogen fluoride (HF), from about 10% to about 35% by weight of ammonium fluoride (NH₄F) and from about 30% to about 80% by weight of de-ionized water (H₂O) based on a total amount of the cleaning solution;
removing the nitride layer from the substrate without damaging the layer underlying the nitride layer, by dipping the substrate into the cleaning solution;
subsequently rinsing the substrate of cleaning solution remaining on the semiconductor substrate; and
subsequently drying the substrate.

15. The method of cleaning a substrate of claim 14, further comprising maintaining the temperature cleaning solution in a range of from about 15°C to about 35°C while the cleaning solution is removing the nitride layer.

16. The method of cleaning a substrate of claim 15, wherein said removing constitutes a Decap process for regenerating the substrate.

17. A method for use in the manufacturing of semiconductor devices, comprising:

providing a control substrate;

forming a nitride layer a plurality of times on the control substrate;

determining a characteristic of the nitride layer after each time a said nitride layer is formed on the control substrate;

regenerating the substrate between respective ones of the plurality of times in which the nitride layers are formed on the substrate by

preparing a cleaning solution comprising from about 10% to about 35% by weight of hydrogen fluoride (HF), from about 10% to about 35% by weight of ammonium fluoride (NH₄F) and from about 30% to about 80% by weight of de-ionized water (H₂O) based on a total amount of the cleaning solution, and

removing the nitride layer from the substrate by dipping the substrate into the cleaning solution.